TVA Kingston Fly Ash Release and Environmental Research Symposium:

Environmental Risk Assessment and Management Overview

Daniel S. Jones
March 11, 2010

Overview

What's been done:

- Recovery Actions
- Assessment Efforts

Why:

- Environmental Management

Risk Assessment

Restoration

Stewardship

Decision-Making

ARCADIS

Environmental Management

Comprised of three major processes

	Remediation	Restoration	Stewardship
Goals	Protection of • Human Health • Environment	Replacement of Environmental Services Lost	Services Maintenance • Human Use • Ecological
Assessments	• HHRA • ERA	NRDA • Human Use • Ecological	Monitoring
Guidance & Guidelines	• RAGS • ERA 8-Step	Federal Guidance • 43 CFR 11	TVA Stewardship Programs and Standard Operating Procedures
Decisions	Risk Management	Services Compensation	Resource Management

ARCADIS

Risk Assessment

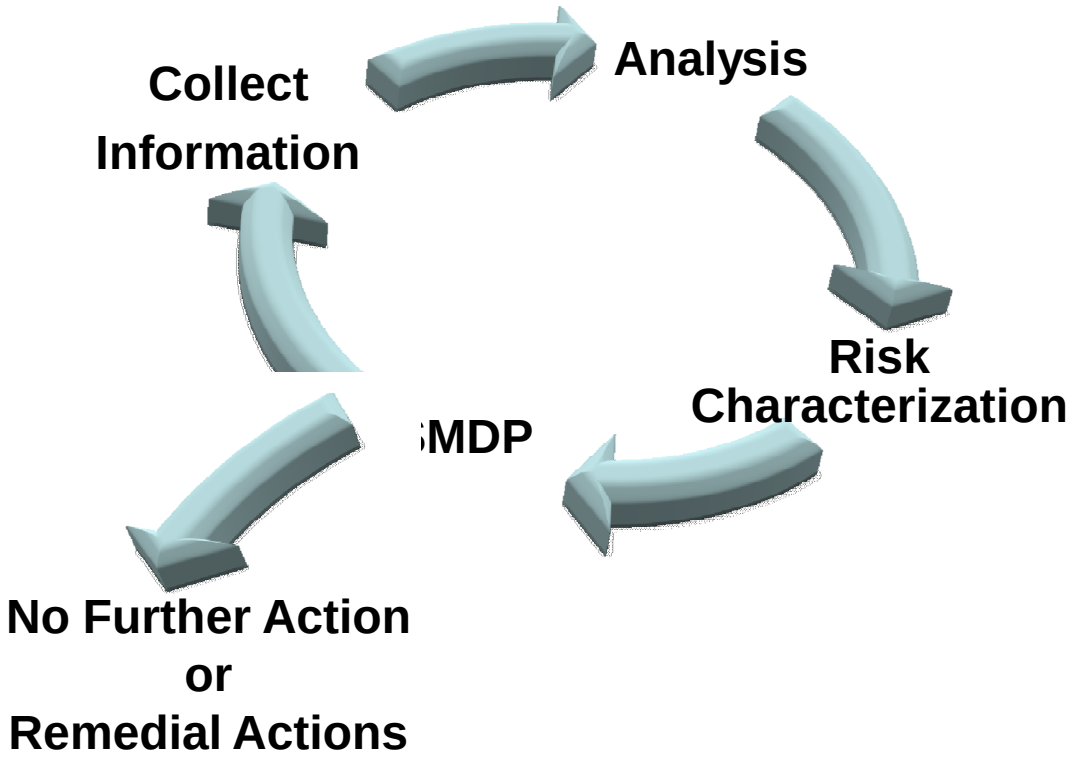
Iterative Process

Historic Releases

- "Stable" conditions
- Start simple
- Identify uncertainties
- Add lines of evidence

Current Releases

- Dynamic conditions
- Start comprehensive
- Document trends
- Focus efforts

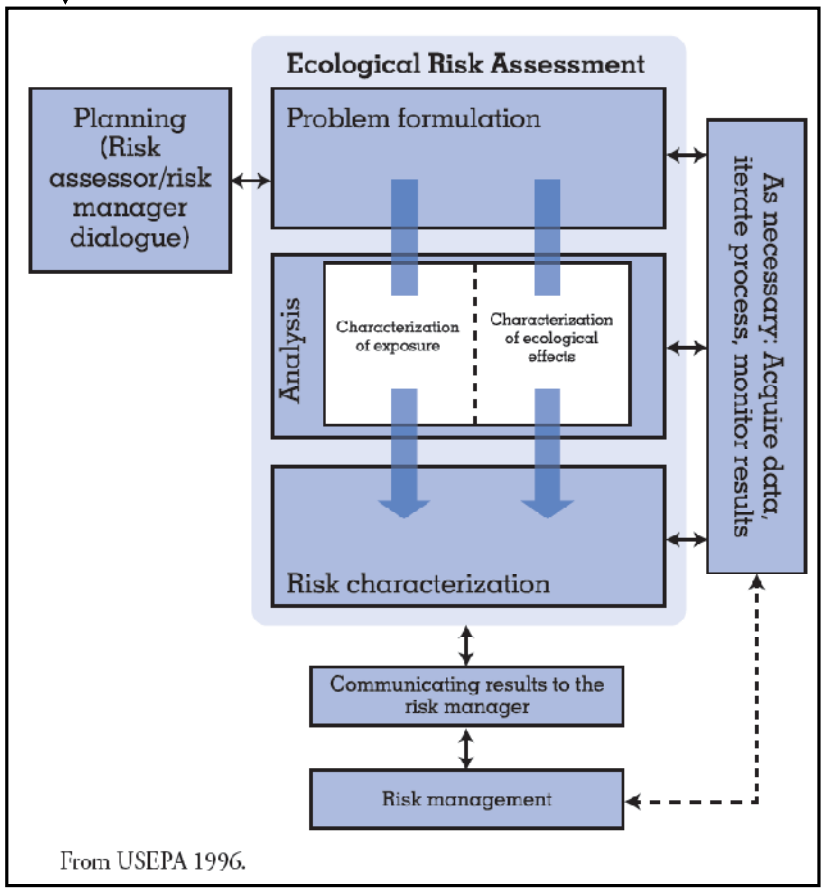


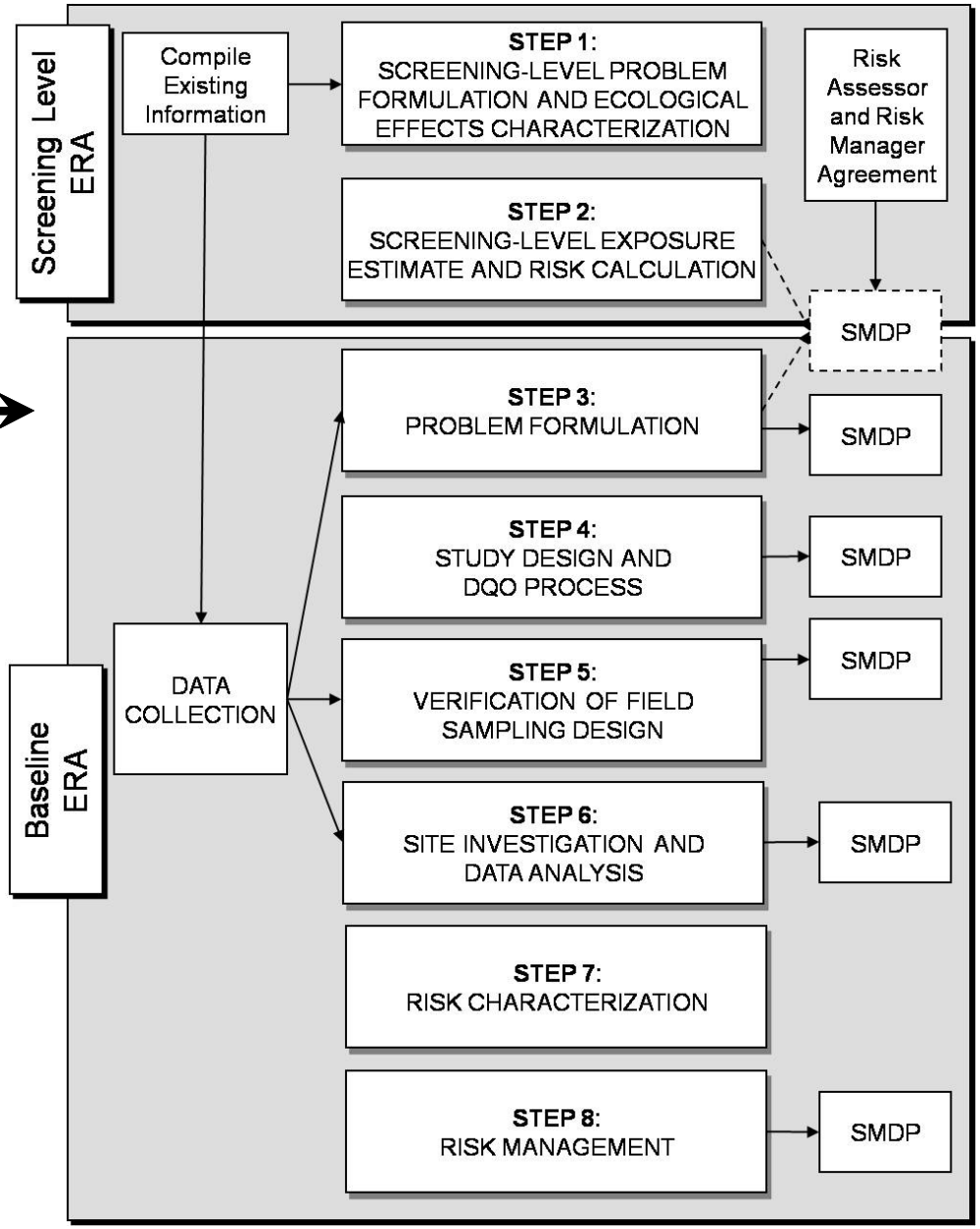
ARCADIS

ERA Process

USEPA Framework

USEPA Superfund 8-Step Guidance





ARCADIS

Cleanup: Phase I

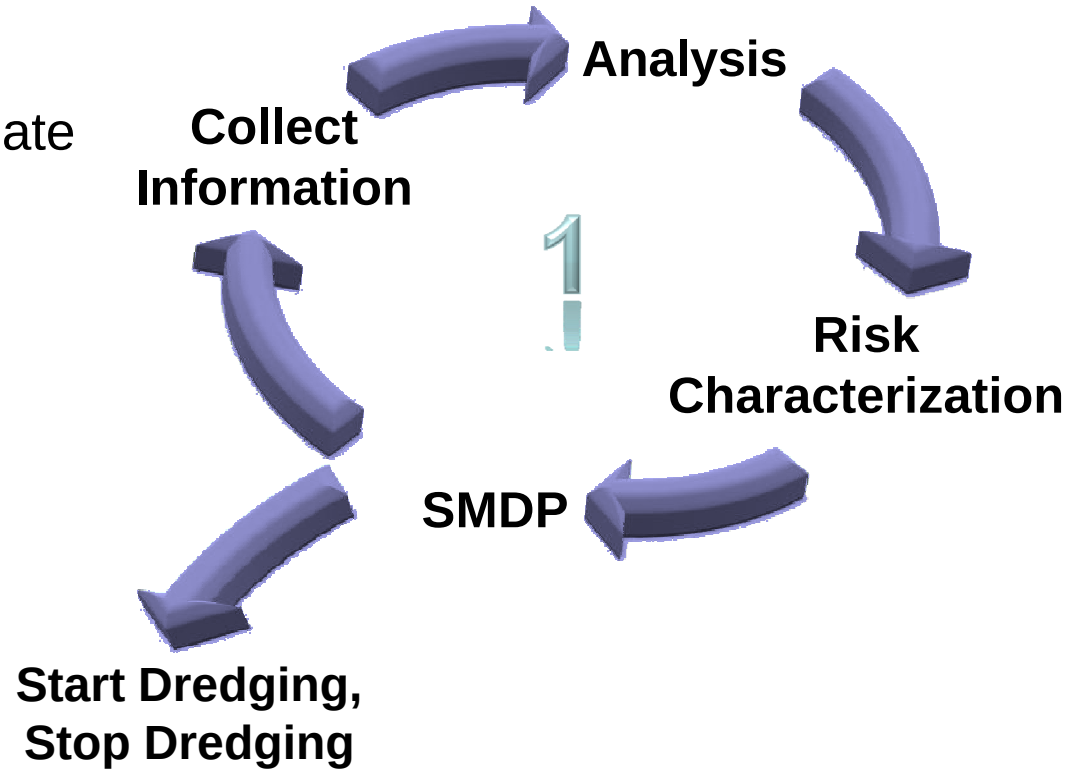
Emory River Channel

Blocked by ash

Risks evident and immediate

- Flooding
- Migration

Time Critical Removal Action



ARCADIS

Cleanup: Phase II

Dredge Cell, Embayment

Stabilized by Dike #2

Non-Time Critical Removal Action

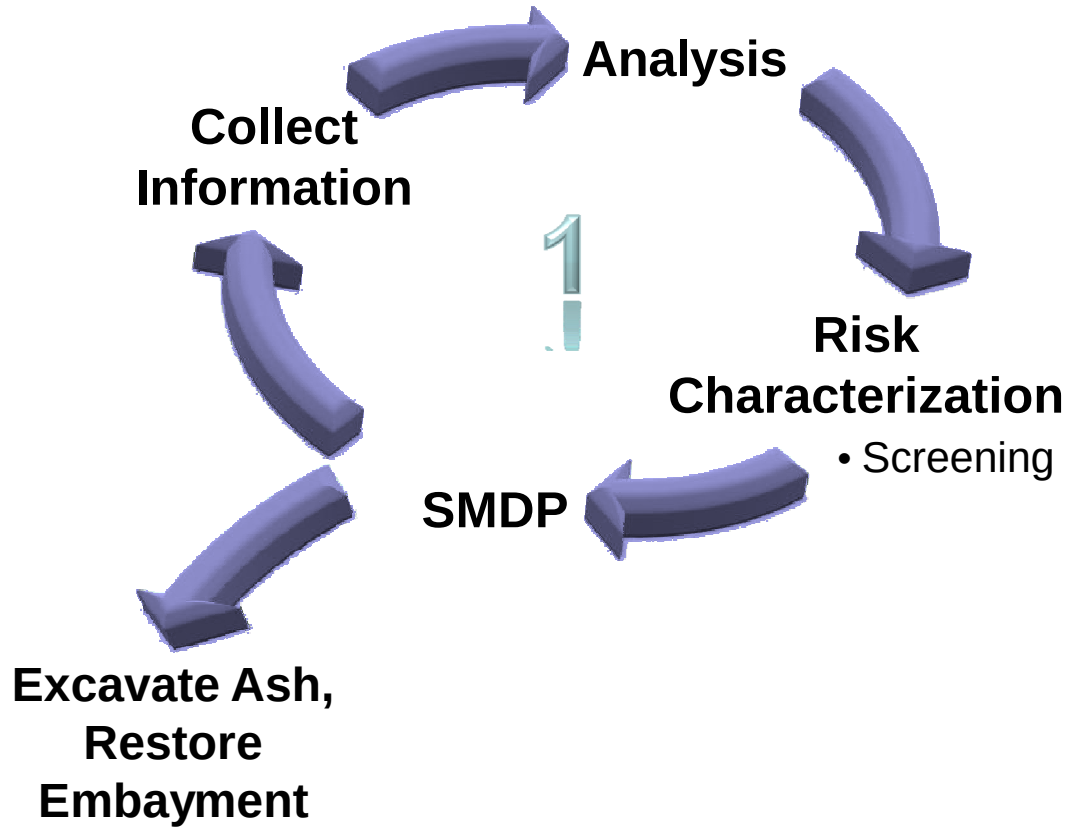
EE/CA Done

Viable alternatives:

- All ash removed from embayment
- Waters restored
- Wetlands restored

Screening RAs done

Baseline RAs unnecessary



ARCADIS

Cleanup: Phase III

River System

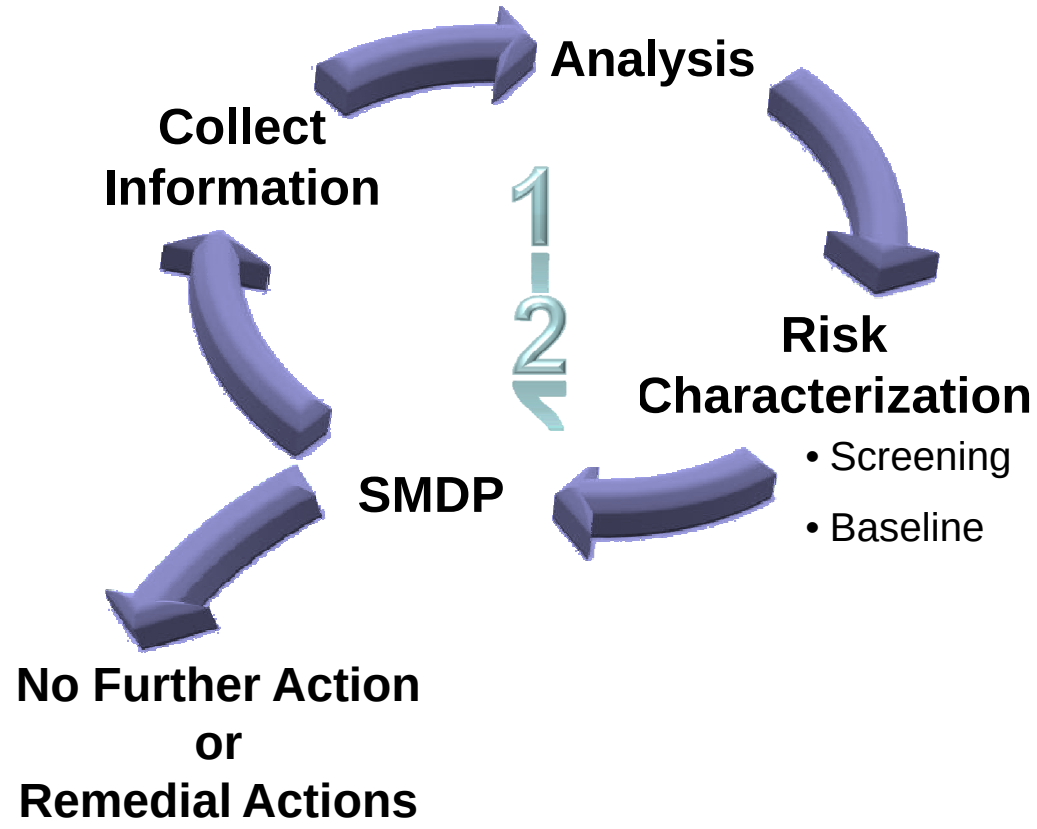
- Emory River (post-dredging)
- Clinch River
- Tennessee River

Non-Time Critical

Removal Action

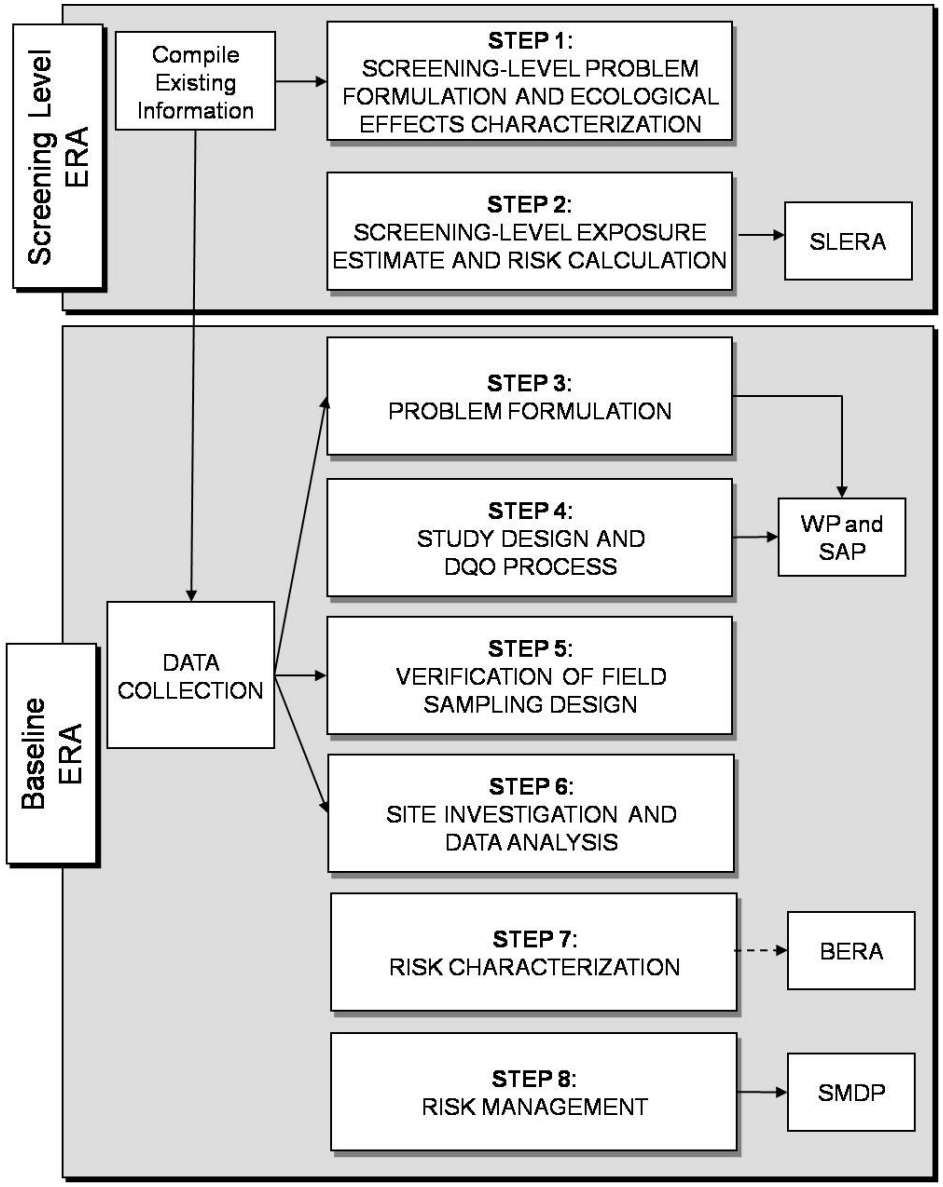
EE/CA planning

- Residual ash, larger area
- Risks are uncertain
- Cleanup is challenging
- Screening RAs done
- Baseline RAs underway



ARCADIS

River System ERA



ARCADIS

River System: Ecological Receptors

Aquatic plants

Pelagic fish

Benthic fish

Benthic invertebrates

Aquatic- or riparian-feeding birds

- Herbivores (wood duck)
- Omnivores (mallard; killdeer)
- Piscivores (osprey; great blue heron)

Aquatic- or riparian-feeding mammals

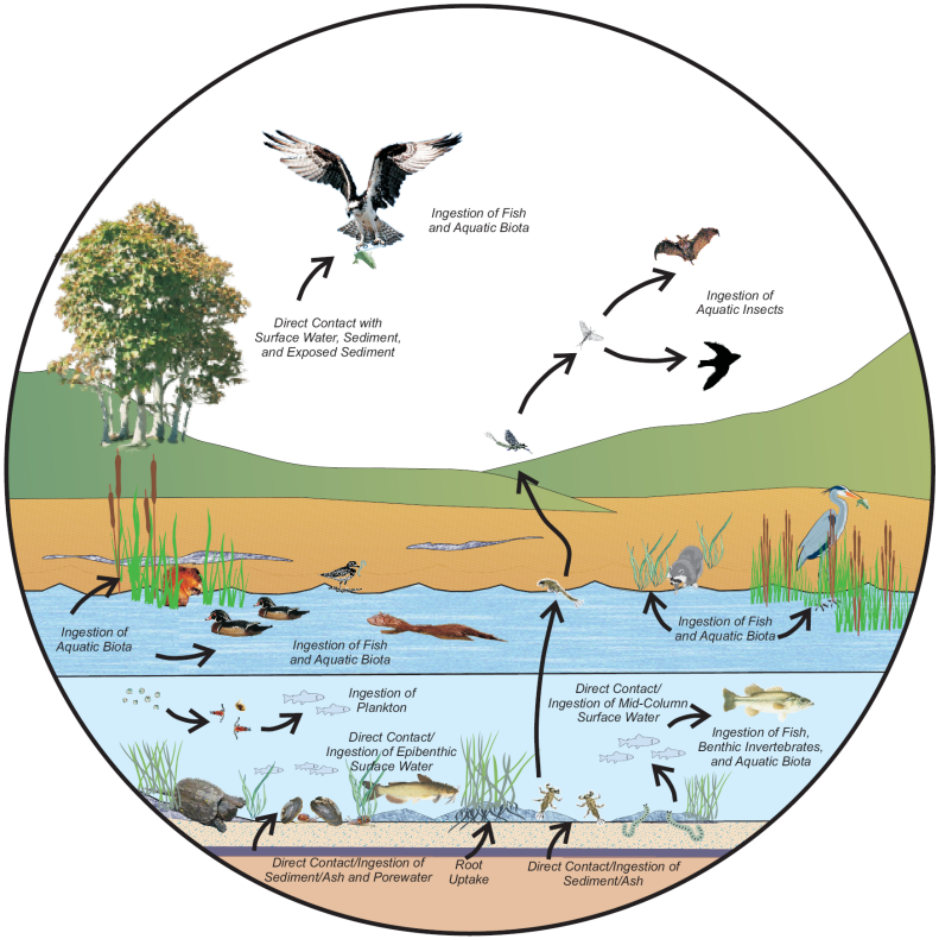
- Herbivores (muskrat)
- Omnivores (raccoon)
- Piscivores (mink)

Aerial-feeding insectivores

- Birds (tree swallow)
- Mammals (gray bat)

Aquatic- or riparian-feeding reptiles

Aquatic- or riparian-feeding amphibians



ARCADIS

Lines-of-Evidence

Exposure concentrations vs. Literature-Derived Effects Values

- Abiotic media
- Biota
- Diet

Bioassays

- Sediment and porewater
- Surface water

Biosurveys

- Fish, Benthics
- Birds, Mammals
- Herps

Weight-of-Evidence

Restoration Status

West Embayment

Completed

Swan Pond Embayment

Ecological Restoration Design

(EE/CA Appendix D)

East Embayment

Begin April 2010

Consistent with Eco RD

River System

To Be Determined

ARCADIS

Environmental Management: Restoration

Natural Resource Damages Assessment

1. **Injuries** are "measurable adverse changes" in natural resources or resource services.

   [15 CFR 990 Subpart E.II.B.1; 43 CFR 11.14(w)]

2. **Baseline** is "…the condition of natural resources and services that would have existed had the incident not occurred."

   (15 CFR 990.30)

3. **Damages** are injuries quantified as lost natural resource services flows.

   [15 CFR 990 Subpart E.II.B.1; 43 CFR 11.14(w)]

Environmental Management: Stewardship

Fly ash release was huge - however:

Not all resources were damaged

Not all services were impaired

TVA continues to:

Monitor resources

Manage services

- Human use
- Ecological

ARCADIS

Environmental Management

Ultimately about making decisions

Assessments must support the decision-making process

Zero-Sum Enterprise

Resources are finite

Time, money, effort and expertise spent on one question or action are not available for other environmental activities

Investments must be made wisely!